SARRESH et al
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AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Cancelled)

2. (Cancelled)

3. (Cancelled)

4. (Cancelled)

5. (Cancelled)

6. (Currently Amended) A method of operating a base station included in a radio access network of a telecommunications system, the method comprising:

(1) obtaining, respectively from two diversity antennas for a cell/carrier utilized in a sector served by the base station, two branches of an uplink radio link signal, the radio link signal being an uplink signal to the radio base station;

(2) routing the two branches of the radio link signal through two respective branches of signal processing hardware subsequent to receipt of the two branches of the uplink radio link signal from the respective two diversity antennas;

(3) using a rake receiver at the base station for measuring a delay difference between the two branches of the radio link signal; ~~The method of claim 5, further comprising:~~

(4) using the delay difference to determine a delay alignment adjustment value for compensating for the delay difference between the two branches of the radio link signal;

performing steps (1) – (3) with respect to radio link signals involved in plural calls with plural user equipment units;

after step (3), determining an average of the plural delay difference values with respect to the plural cells; and

as step (4), using the average delay difference to determine the delay adjustment value.

7. (Original) The method of claim 6, further comprising:

utilizing plural rake receivers for measuring delay difference values between the two branches of the radio link signals, at least one of the plural rake receivers being utilized for plural cell/carriers;

for each of the plural rake receivers, storing, in a memory, the average of the plural delay difference values measured for a specified cell/carrier by the rake receivers;

periodically accessing the memory to obtain the average of the plural delay difference values for each of the plural rake receivers for the specified cell/carrier for calculating the delay alignment adjustment value for the specified cell/carrier.

8. (Original) The method of claim 7, further comprising:

for each of the plural rake receivers, storing for each of the plural cell/carriers, in a memory, an average of plural delay difference values measured by the rake receivers;

periodically accessing the memory to obtain the average of the plural delay difference values for each of the plural rake receivers on a per cell/carrier basis for calculating the delay alignment adjustment value for each of the plural cell/carriers.

9. (Currently Amended) The method of claim ~~5~~6, further comprising applying the delay alignment adjustment value to one of the two branches of signal processing hardware to compensate for the delay difference.

10. (Original) The method of claim 9, further comprising applying the delay alignment adjustment value to a delay alignment buffer included in the one of the two branches of signal processing hardware to compensate for the delay difference.

11. (Cancelled)

12. (Currently Amended) A method of operating a base station included in a radio access network of a telecommunications system, the method comprising:

(1) obtaining, respectively from two diversity antennas for a cell/carrier utilized in a sector served by the base station, two branches of an uplink radio link signal;

(2) routing the two branches of the radio link signal through two respective branches of signal processing hardware subsequent to receipt of the two branches of the uplink radio link signal from the respective two diversity antennas;

(3) measuring a delay difference between the two branches of the radio link signal; ~~The method of claim 1, further comprising:~~

(A) performing steps (1) - (3) with respect to a radio link signal received from a test user equipment unit which is situated essentially equidistantly between the two diversity antennas, and thereby obtaining a hardware delay value;

(B) performing steps (1) - (3) with respect to a radio link signal received from a non-test user equipment unit which utilizes the cell/carrier in the sector, and thereby obtaining a total delay value;

(C) using the total delay value and the hardware delay value to determine an angle of arrival for the radio link signal received from a non-test user equipment unit.

13. (Original) The method of claim 12, wherein step (C) further comprises:

using the total delay value and the hardware delay value to determine a delay component attributable to the angle of arrival of the radio link signal from the non-test user equipment unit;

using the delay component attributable to the angle of arrival of the radio link signal from the non-test user equipment unit to determine an arrival delay component, the arrival delay component being represented by a projection of a distance separating the two diversity antennas on a direction of approach of the radio link signal from the non-test user equipment unit;

using the arrival delay component to determine the angle of arrival.

14. (Original) The method of claim 12, further comprising:

performing step (B) and step (C) for plural non-test user equipment units which utilize the cell/carrier in the sector;

accumulating statistics pertaining to the angle of arrival of radio link signals received by the plural non-test user equipment units.

15. (Cancelled)

16. (Cancelled)

17. (Cancelled)

18. (Cancelled)

19. (Currently Amended) A base station included in a radio access network of a telecommunications system and comprising:

two diversity antennas for a cell/carrier utilized in a sector served by the base station from which are respectively obtained two branches of an uplink radio link signal transmitted between the base station and a user equipment unit;

two branches of signal processing hardware at the base station which respectively process the two branches of the uplink radio link signal either before or after transmission between the user equipment unit and the base station; and

~~The apparatus of claim 18, further comprising:~~

plural rake receivers which, with respect to radio link signals involved with plural calls with plural user equipment units, measure delay difference values between the two branches of the plural radio link signals, at least one of the plural rake receivers being utilized for plural cell/carriers;

a local memory for each of the plural rake receivers in which is stored an average of plural delay difference values measured for a specified cell/carrier by the rake receivers;

a processor which uses the delay difference to determine a delay alignment adjustment value, and wherein the processor periodically accesses the local memory to obtain the average of the plural delay difference values for each of the plural rake receivers for the specified cell/carrier for calculating the delay alignment adjustment value for the specified cell/carrier.

20. (Original) The apparatus of claim 19, wherein each rake receiver is situated on a board which has a board processor which computes the average of plural delay difference values measured for the specified cell/carrier; and

wherein the processor which periodically accesses the local memory is a main processor which is distinct from the board processor.

21. (Original) The apparatus of claim 20, further comprising an array of rake receivers each having a board processor which is periodically accessed by the main processor.

22. (Original) The apparatus of claim 19, wherein the processor periodically accesses the local memories for the plural rake receivers to obtain the average of the plural delay difference values for each of the plural rake receivers on a per cell/carrier basis for calculating the delay alignment adjustment value for each of the plural cell/carriers.

23. (Original) The apparatus of claim 22, wherein each rake receiver is situated on a board which has a board processor which computes the average of plural delay difference values measured for the specified cell/carrier; and

wherein the processor which periodically accesses the local memory is a main processor which is distinct from the board processor.

24. (Currently Amended) The apparatus of claim ~~18~~19, wherein the delay alignment adjustment value is applied to one of the two branches of signal processing hardware.

25. (Original) The apparatus of claim 24, wherein the delay alignment adjustment value is applied to a delay alignment buffer included in the one of the two branches of signal processing hardware.

26. (Original) A radio access network of a telecommunications system comprising:

a base station having two diversity antennas for a cell/carrier utilized in a sector served by the base station;

a test user equipment unit situated essentially equidistantly with respect to the two diversity antennas, two branches of an uplink radio link signal received from the test user equipment unit being obtained respectively from the two diversity branches;

the base station further comprising:

two branches of signal processing hardware which respectively process the two branches of the radio link signal;

a rake receiver which measures a delay difference between the two branches of the uplink radio link signal.

27. (Original) The apparatus of claim 26, further comprising a processor which uses the delay difference to determine a delay alignment adjustment value.

28. (Currently Amended) A radio access network of a telecommunications system comprising:

a base station having two diversity antennas for a cell/carrier utilized in a sector served by the base station;

a test user equipment unit situated essentially equidistantly with respect to the two diversity antennas, two branches of an uplink radio link signal received from the test user equipment unit being obtained respectively from the two diversity branches;

the base station further comprising:

two branches of signal processing hardware which respectively process the two branches of the radio link signal;

a rake receiver which measures a delay difference between the two branches of the uplink radio link signal; ~~The apparatus of claim 27, further comprising:~~

a local memory for the rake receiver in which is stored an average of plural delay difference values measured for the cell/carrier by the rake receiver;

a processor which uses the delay difference to determine a delay alignment adjustment value, and wherein the processor periodically accesses the local memory to obtain the average of the plural delay difference values for calculating the delay alignment adjustment value for the cell/carrier.

29. (Original) The apparatus of claim 28, wherein the rake receiver is situated on a board which has a board processor which computes the average of plural delay difference values measured for the cell/carrier; and

wherein the processor which periodically accesses the local memory is a main processor which is distinct from the board processor.

30. (Currently Amended) The apparatus of claim ~~27~~28, wherein the delay alignment adjustment value is applied to one of the two branches of signal processing hardware.

31. (Original) The apparatus of claim 30, wherein the delay alignment adjustment value is applied to a delay alignment buffer included in the one of the two branches of signal processing hardware.

32. (Previously Presented) A radio access network of a telecommunications system comprising:

a base station having two diversity antennas for a cell/carrier utilized in a sector served by the base station;

a test user equipment unit situated essentially equidistantly with respect to the two diversity antennas, two branches of a radio link signal received from the test user equipment unit being obtained respectively from the two diversity branches;

the base station further comprising:

two branches of signal processing hardware which respectively process the two branches of the radio link signal;

means for measuring a delay difference between the two branches of the radio link signal;

a non-test user equipment unit which utilizes the cell/carrier in the sector, wherein the two branches of signal processing hardware respectively process the two branches of the radio link signal received from the non-test user equipment unit;

wherein the means for measuring measures a delay difference between the two branches of the radio link signal for the non-test user equipment unit to obtain a total delay value;

wherein the delay difference between the two branches of the radio link signal measured for the test user equipment unit is used as a hardware delay value; and further comprising

an angle of arrival determination unit which uses the total delay value and the hardware delay value to determine an angle of arrival for the radio link signal received from the non-test user equipment unit.

33. (Original) The apparatus of claim 32, wherein the angle of arrival determination unit executes the steps of:

(A) using the total delay value and the hardware delay value to determine a delay component attributable to the angle of arrival of the radio link signal from the non-test user equipment unit;

(B) using the delay component attributable to the angle of arrival of the radio link signal from the non-test user equipment unit to determine an arrival delay component, the arrival delay component being represented by a projection of a distance separating the two diversity antennas on a direction of approach of the radio link signal from the non-test user equipment unit;

(C) using the arrival delay component to determine the angle of arrival.

34. (Original) The apparatus of claim 33, wherein the angle of arrival determination unit performs step (B) and step (C) for plural non-test user equipment units

which utilize the cell/carrier in the sector; and accumulates statistics pertaining to the angle of arrival of radio link signals received by the plural non-test user equipment units.

35. (Cancelled)

36. (Cancelled)

37. (Cancelled)

38. (Cancelled)

39. (Cancelled)

40. (Previously Presented) The apparatus of claim 44, wherein the user equipment unit comprises a rake receiver which measures the delay difference between the two branches of the radio link signal.

41. (Previously Presented) The apparatus of claim 44, further comprising a processor at the base station which uses the delay difference to determine a delay alignment adjustment value.

42. (Original) The apparatus of claim 41, wherein the delay alignment adjustment value is applied to one of the two branches of signal processing hardware.

43. (Original) The apparatus of claim 42, wherein the delay alignment adjustment value is applied to a delay alignment buffer included in the one of the two branches of signal processing hardware.

44. (Previously Presented) A radio access network of a telecommunications system comprising:

a base station having two diversity antennas for a cell/carrier utilized in a sector served by the base station;

a test user equipment unit situated essentially equidistantly with respect to the two diversity antennas, two branches of a radio link signal being transmitted between the test user equipment unit and the two diversity antennas;

the base station further comprising two branches of signal processing hardware which respectively process the two branches of the radio link signal; and

wherein the test user equipment unit measures a delay difference between the two branches of the radio link signal and transmits a report of the delay difference over an air interface to the base station.

45. (Previously Presented) A method of operating a telecommunications system, the method comprising:

routing two branches of a radio link signal through corresponding two branches of signal processing hardware at a base station and applying the two branches of the radio link signal respectively to two diversity antennas at the base station;

transmitting the two branches of the radio link signal over an air interface from the two diversity antennas to a test user equipment unit, the test user equipment unit being situated essentially equidistantly with respect to the two diversity antennas;

at the user equipment unit, measuring a delay difference between the two branches of the radio link signal and transmitting a report of the delay difference over an air interface to the base station.

46. (Previously Presented) The method of claim 44, further comprising using a rake receiver at the user equipment unit for measuring the delay difference between the two branches of the radio link signal.

47. (Previously Presented) The method of claim 44, further using the delay difference to determine a delay alignment adjustment value.

48. (Previously Presented) The method of claim 47, further comprising applying the delay alignment adjustment value to one of the two branches of signal processing hardware.

49. (Previously Presented) The method of claim 48, further comprising applying the delay alignment adjustment value to a delay alignment buffer included in the one of the two branches of signal processing hardware.